

REMARKS

Claims 2-9, 32-36 and 64-82 are currently pending in the application. Claims 2-4 and 7 have been amended in this response.

In the Office Action mailed October 18, 2005, claims 2-9, 32, 34-36, 64-69, 71-74 and 76-80 were rejected. More specifically, the status of the claims in light of this Office Action is as follows:

(A) Claims 2, 3, 7 and 9 were rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent No. 6,335,208 to Lowry ("Lowry");

(B) Claim 8 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Lowry;

(C) Claims 4-6 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Lowry in view of U.S. Patent No. 5,723,900 to Kojima et al. ("Kojima");

(D) Claims 2, 3, 7-9, 32, 34-36, 64-69, 71-74 and 76-80 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Application Publication No. 2002/0173070 to Bolken et al. ("Bolken") and Lowry;

(E) Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Bolken, Lowry and Kojima;

(F) Claims 64, 65, 69, 74, 76 and 78-80 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bolken and Kojima; and

(G) Claims 33, 70, 75, 81 and 82 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form to include the features of the claims from which they depend.

A. Response to the Section 102(e) Rejection

Claims 2, 3, 7 and 9 were rejected under 35 U.S.C. § 102(e) as being anticipated by Lowry. As set forth below, Lowry fails to disclose all the features of these claims.

1. Claim 3 is Directed to a Method for Packaging a Microelectronic Substrate Including Mounting a Substrate to a Dielectric Support Member and Electrically Coupling the Substrate to the Support Member

Claim 3 is directed to a method for packaging a microelectronic substrate including mounting a microelectronic substrate to a dielectric support member with a first surface of the substrate facing the support member and a second surface of the substrate facing away from the support member. The method further includes electrically coupling the microelectronic substrate to the support member, disposing an encapsulating material adjacent to both the microelectronic substrate and the support member, and exposing at least a portion of the second surface of the substrate by directing laser radiation toward the encapsulating material to ablate a portion of the encapsulating material.

2. Lowry Discloses a Decapsulation Apparatus

Lowry discloses a decapsulation apparatus including a laser that removes plastic encapsulant from "a device under test (DUT), i.e., integrated circuit." (Lowry, 2:36-37.) The laser has a tunable frequency and intensity for removing plastic encapsulant from the device without causing damage to the integrated circuit.

3. Lowry Fails to Disclose a Method of Packaging a Microelectronic Substrate Including Mounting a Microelectronic Substrate to a Dielectric Support Member and Electrically Coupling the Substrate to the Support Member

Lowry fails to disclose a method for packaging a microelectronic substrate including, *intra alia*, "mounting a microelectronic substrate to a dielectric support member" and "electrically coupling the microelectronic substrate to the support member," as recited in claim 3. At most, Lowry discloses an encapsulated integrated circuit. Nowhere does Lowry disclose mounting the integrated circuit to a dielectric support member before encapsulating the integrated circuit. Accordingly, Lowry fails to disclose all the features of claim 3. Moreover, one skilled in the art would not be motivated to modify Lowry to include the features of claim 3 for the reasons described below. Therefore, the Section 102(e) rejection of claim 3 should be withdrawn.

4. Claim 7 is Directed to a Method for Packaging a Microelectronic Substrate Including Molding an Encapsulating Material onto a Memory Chip

Claim 7 is directed to a method for packaging a microelectronic substrate including molding an encapsulating material onto the microelectronic substrate and exposing at least a portion of a surface of the substrate by removing a portion of the encapsulating material with the substrate in an operable condition after the portion of the encapsulating material is removed. Removing the portion of the encapsulating material includes directing laser radiation toward the encapsulating material. The microelectronic substrate includes a memory chip.

5. Lowry Fails to Disclose a Method for Packaging a Microelectronic Substrate Including Molding an Encapsulating Material onto a Memory Chip

Lowry fails to disclose a method for packaging a microelectronic substrate including, *intra alia*, "molding an encapsulating material onto the microelectronic substrate . . . wherein the microelectronic substrate includes a memory chip," as recited in claim 7. In the Office Action, the Examiner correctly notes that Lowry "does not show a memory chip." (Office Action, p. 4.) At most, Lowry discloses an encapsulated integrated circuit. Therefore, Lowry fails to disclose each and every element of claim 7. Moreover, one skilled in the art would not be motivated to modify Lowry to include the features of claim 7 for the reasons described below in Section C. Accordingly, the Section 102(e) rejection of claim 7 should be withdrawn.

Claims 2 and 9 depend from claim 7. Accordingly, the Section 102(e) rejection of claims 2 and 9 should be withdrawn for at least the reasons described above with reference to claim 7 and for the additional features of these claims.

B. Response to the Section 103(a) Rejection over Lowry

Claim 8 was rejected under 35 U.S.C. § 103(a) as being obvious in light of Lowry. Claim 8 depends from claim 7. Accordingly, the Section 103(a) rejection of claim 8 should be withdrawn for at least the reasons discussed above with reference to claim 7 and for the additional features of this claim.

C. Response to the Section 103(a) Rejection over Lowry and Kojima

Claims 4-6 were rejected under 35 U.S.C. § 103(a) as being obvious in light of Lowry and Kojima. Claims 4-6 depend from claim 7. As set forth below, one skilled in the art would not be motivated to modify Lowry in light of Kojima to include the features of these claims.

1. Kojima Discloses a Method for Forming a Thin Semiconductor Device Including Grinding the Mold Resin and Semiconductor Chip to Planarize the Rear Surface of the Device

Kojima discloses a method for forming a thin, molded semiconductor device in which the thickness of the device is defined by the thickness of the lead frame. First, a semiconductor chip 13 is coupled to an inner lead 16 of a lead frame 12 such that the chip 13 projects above the lead frame 12 (Kojima, Figure 4G). Next, the semiconductor chip 13 and the inner lead 16 are encapsulated with a resin 14 (Kojima, Figure 4H). "In this state, the semiconductor chip 13 and the mold resin 14 project out from the surface of the outer lead 15A." (Kojima, 4:59-61.) "After molding with the resin 14, a rear surface 13a of the semiconductor chip 13 is ground so as to be flush with the upper surface of the outer lead 15." (Kojima, 3:59-61; Figure 4I.) Accordingly, the semiconductor chip 13 is thinned to create a planar surface across the outer lead 15 and the rear surface 13a of the chip 13.

2. One Skilled in the Art Would Not Be Motivated to Combine Lowry and Kojima Because Kojima Teaches Away From Such a Combination

One skilled in the art would not be motivated to combine Lowry and Kojima because Kojima teaches away from removing mold resin from his chip with Lowry's laser. Kojima grinds the back side of his packaged device to remove both the mold resin and the back side of the semiconductor chip so that the surface of the mold resin and the "rear surface 13a of the semiconductor chip 13 . . . [are] flush with the upper surface of the outer lead 15." (Kojima, 3:59-61; Figure 4I.) Kojima teaches away from removing portions of his mold resin and chip with Lowry's laser because the laser would have several disadvantages. First, it is difficult to precisely control the depth of a laser cut—and would be especially difficult to precisely control the depth while cutting two

different materials, namely the chip and mold resin. Second, cutting Kojima's device with a laser would generate significant heat in the chip that may cause dopants in the chip to diffuse. The diffusion of dopants in the chip can result in defective active devices and an inoperable chip. Third, the heat from the laser may break the bonds between the mold resin, semiconductor chip, and/or lead because each component has a different coefficient of thermal expansion. For example, the difference in the coefficients of thermal expansion may cause the bump 17 at the tip of the inner lead 16 to detach from the electrode pad 18 of the chip 13. If the bonds between any of the components were to break, the semiconductor chip may become defective or inoperable. Therefore, one skilled in the art would not be motivated to combine Lowry and Kojima because Kojima teaches away from removing mold resin from his chip with Lowry's laser. Accordingly, the Section 103(a) rejection of claim 7 should be withdrawn.

D. Response to the Section 103(a) Rejection over Bolken and Lowry

Claims 2, 3, 7-9, 32, 34-36, 64-69, 71-74 and 76-80 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bolken in view of Lowry. Bolken and Lowry cannot be combined to form a Section 103(a) rejection of the present claims because Bolken is not prior art under any subsection of Section 102. Specifically, Bolken is a divisional of U.S. Patent Application No. 09/643,193, filed on August 21, 2000, and the present application was filed on August 16, 2000. Accordingly, the Section 103(a) rejection of claims 2, 3, 7-9, 32, 34-36, 64-69, 71-74 and 76-80 over Bolken and Lowry should be withdrawn.

E. Response to the Section 103(a) Rejection over Bolken, Lowry and Kojima

Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Bolken, Lowry and Kojima. As described above, Bolken is not prior art to the present application. Accordingly, the Section 103(a) rejection of claim 4 over Bolken, Lowry and Kojima is improper and should be withdrawn.

F. Response to the Section 103(a) Rejection over Bolken and Kojima

Claims 64, 65, 69, 74, 76 and 78-80 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Bolken and Kojima. As described above, Bolken is not prior

art to the present application. Accordingly, the Section 103(a) rejection of claims 64, 65, 69, 74, 76 and 78-80 over Bolken and Kojima is improper and should be withdrawn.

G. Allowable Subject Matter

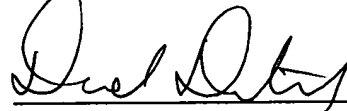
Claims 33, 70, 75, 81 and 82 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form to include the features of the claims from which they depend. These claims have not been rewritten in independent form because the rejection of their respective independent claims should be withdrawn.

H. Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the applied art. The applicant accordingly requests reconsideration of the application and a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call David Dutcher at (206) 359-6465.

Respectfully submitted,

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